

WHAT IS CLAIMED IS:

Sub a¹ 1. A method for cutting a hole of a hole size in a composite material workpiece, the method comprising the steps of:

providing the composite material workpiece;
selecting a milling cutter having an effective cutter size less than the hole size;
mounting the composite material workpiece in operable relation to the milling cutter;

rotating the milling cutter about an axis of rotation; and
advancing the milling cutter longitudinally into the composite material workpiece parallel to the axis of rotation at a rate of longitudinal advance, while laterally moving the milling cutter perpendicular to the axis of rotation to interpolate the hole.

2. The method of claim 1, wherein the step of providing includes the step of providing a ceramic matrix composite material workpiece.

3. The method of claim 1, wherein the step of providing includes the step of providing a silicon carbide/silicon carbide composite material workpiece.

4. The method of claim 1, wherein the step of mounting includes the steps of
providing a backing fixture, and
affixing the composite material workpiece to the backing fixture with an adhesive material.

5. The method of claim 4, wherein the step of affixing includes the step of affixing the composite material workpiece to the backing fixture with a thermosetting adhesive material.

6. The method of claim 4, including an additional step, after the step of

advancing, of
removing the composite material workpiece from the backing fixture.

7. The method of claim 1, wherein the step of advancing includes the step of
controlling the rate of longitudinal advance such that the hole remains substantially a flat-bottomed hole as it is cut.

8. The method of claim 1, wherein the hole is cylindrical with a hole diameter, and wherein the step of selecting includes the step of
selecting the miller cutter to be cylindrical with an effective cutter diameter less than the hole diameter.

9. The method of claim 1, wherein the step of advancing includes the step of
advancing the milling cutter longitudinally into the composite material workpiece less than a thickness of the composite material workpiece, thereby forming a blind hole.

10. The method of claim 1, wherein the step of advancing includes the step of
advancing the milling cutter longitudinally into the composite material workpiece by at least a thickness of the composite material workpiece, thereby forming a through hole.

11. A method for cutting a hole of a hole size in a composite material workpiece, the method comprising the steps of:
providing the composite material workpiece;
selecting a milling cutter having an effective cutter size less than the hole size;
mounting the composite material workpiece in operable relation to the milling cutter wherein the step of mounting includes the steps of

providing a backing fixture, and
affixing the composite material workpiece to the backing fixture with an
adhesive material;

rotating the milling cutter about an axis of rotation;

advancing the milling cutter longitudinally into the composite material workpiece
parallel to the axis of rotation at a rate of longitudinal advance, while laterally moving the
milling cutter perpendicular to the axis of rotation to interpolate the hole, the step of
advancing including the step of controlling the rate of longitudinal advance such that the
hole has a substantially constant depth over its entire area as it is cut; and, after the hole
is completed,

removing the composite material workpiece from the backing fixture.

12. The method of claim 11, wherein the step of providing includes the step
of
providing a ceramic matrix composite material workpiece.

13. The method of claim 11, wherein the step of providing includes the step
of
providing a silicon carbide silicon carbide composite material workpiece.

14. The method of claim 11, wherein the composite material workpiece has
a front face to which the milling cutter is first contacted and an oppositely disposed back
face, and wherein the step of providing the backing fixture includes the step of
providing the backing fixture having a shape conformed to the back face of the
composite material workpiece.

15. The method of claim 14, wherein the step of providing the backing fixture
includes the step of
providing a nonplanar backing fixture.

16. The method of claim 11, wherein the step of affixing includes the step of affixing the composite material workpiece to the backing fixture with a thermosetting adhesive material.

17. The method of claim 11, wherein the hole is cylindrical with a hole diameter, and wherein the step of selecting includes the step of selecting the miller cutter to be cylindrical with an effective cutter diameter less than the hole diameter.

18. The method of claim 11, wherein the step of advancing includes the step of advancing the milling cutter longitudinally into the composite material workpiece less than a thickness of the composite material workpiece, thereby forming a blind hole.

19. The method of claim 11, wherein the step of advancing includes the step of advancing the milling cutter longitudinally into the composite material workpiece by at least a thickness of the composite material workpiece, thereby forming a through hole.